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Original Paper

Media Socialization of Children on Eating Habits: A Study of How Television Content Nourish Their Lives

"There can be no keener revelation of a society's soul than the way in which it treats its children".

Nelson Mandela

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Abstract

Sri Lankan mass media from time to time have published reports that many school children in cities are overweight or obese. How serious is the problem? Is Television viewing the most probable cause for health problems connected with children? The aim of this research was to investigate the association between assumed risk factors and Body Mass Index (BMI) in children in urban schools in Sri Lanka. Specifically, the study attempts to identify the relationship between television viewing, fast foods, physical activity, and vegetable consumption in relation to BMI. Using a multiple cluster sample, out of nine provinces of Sri Lanka six provinces were purposely chosen for this study representing urban and semi-urban districts. This study was conducted through a mix approach including all ethnic groups in Sri Lanka. Our findings indicate that in both groups (male and female) there was a positive association between television viewing and BMI and there was evidence that the more television was watched the higher the BMI. We found that physical activity in both groups was negatively associated with BMI, although the effect size was small. In both groups eating vegetables (+nuts) were associated with a lower BMI, and there was a dose-effect. In girls eating fast food was positively associated with BMI, but in boys was negatively associated with BMI.

Keywords

school children, eating habits, body mass index, television viewing, obesity, overweight

1. Introduction

An opening of Leisure parks, exercise, and bodybuilding shops, new cloth shops catering for plus-sized population, hospitals opening new clinics to reduce body fat and offering advice, how to maintain and cultivate a slim body and how to eat nutritious and healthy food is a recent phenomenon in urban cities in Sri Lanka.

These trends are spawning even in semi-urban and rural areas of Sri Lanka. Though all these are praiseworthy and useful for adults, one does not see that these facilities are for children or new initiatives taken to benefit children. However, children are the future of any country and much importance needs to be given to their basic needs and wellbeing. School going age is a vital, important period during which the body's nutritional status is built and other social values inculcated. If children are unhealthy and overweight, they are more like to have adverse levels of multiple risk factors and end as becoming obese adults (Freedman & Sherry, 2009).

Basic wellbeing and health indicators are usually measured by using Body Mass Index. Thus it warrants measuring whether BMI levels increase or decrease based on one's food preferences. BMI (Body Mass Index) cut-off points for overweight and obesity are useful and applicable to any country and BMI can be used as a good indicator of excess adiposity or obesity. Further, uses of BMI can be applied to population data to inform and trigger policy action, to facilitate prevention programs, and to measure the effects of interventions. In plain language, BMI cut off points are useful for identifying high-risk individuals for screening, identifying individuals for absolute risk assessment, to determine the type and intensity of treatment, to monitor individuals for effects of treatment over time, to determine institutional policies on individuals, such as insurance policies and reimbursement policies and to raise awareness of risks for individuals.

"Rights under the Convention of the Rights of the Child", says that in Article 17 (Access to information; mass media): Children have the right to get information that is important to their health and well-being. Governments should encourage mass media—radio, television, newspapers, and internet content sources—to provide information that children can understand and to not promote materials that could harm children.

As an upshot of globalization, junk food, and instant food outlets, are mushrooming at a speed all over Sri Lanka. One of the negative consequences is that it has created a considerable change in the nutritional status and disease pattern all over the world. Obesity has swopped its place with under-nutrition.

This research paper dealing with food habits of school children and the habit of television viewing in this context is arranged according to the following structure. After the background and the introduction, there will be an extensive literature review of the themes that are directly connected with the topic of this research paper. It will cover extensive scholarly findings local as well as foreign about the main

variables of this research. It will be followed by the theoretical background that will help to understand the implications of the findings of this research. After the theoretical background, problem statement and the objectives of this research will be enumerated. It will be followed by the methodology and the findings, both quantitative as well as qualitative limitations and the bibliography.

2. Literature Review

Besides, other variables that influence eating behaviours and food choices of young people, especially children, previous researchers have documented that two potent forces namely television (TV) viewing and exposure to TV food advertising are also responsible for cultivating their eating habits. This claim needs to be investigated because television today, remains the most prominent medium of marketing food and beverages to youth, especially for those in early childhood.

A major determinant of food preferences is taste. Eating habits and taste preference develop early in life and remain relatively stable through young adulthood. Usually, taste preferences are acquired through learning processes including repeated exposure and positive messaging about various foods. Exposure to television viewing early in life can have a deliberate lifelong influence on eating practices. Food and beverage marketing is considered a major factor that influences children's food preferences and purchasing requests. Most, marketers use many gimmicks to reach children with their messages such as using popular cartoon characters and toy giveaways to increase the pestering of young children.

Sri Lankan regulations ensuring advertising are Food Act (1980), Intellectual Property Act (2003) Cosmetics, Devices and Drugs Act (1980), Obscene Publications Ordinance (1983), Consumer Affairs Authority Act (2003), legislation protecting children, and the Code of Practice in Television Advertising of the Sri Lanka Rupavahini Corporation. Though advertising is being regulated by these multiple regulations and institutions, there is no single regulation or authority to govern all aspects of advertising. Probably due to this reason, some advertisers appear to "escape" rules and regulations and display unethical, anti-social, deceptive or illegal material in their advertisements.

Many studies reveal that there is an increasing burden of obesity and overweight among children as well as adolescents in South Asia (Mistry & Puthussery, 2015). Childhood obesity has tripled in the recent past in Sri Lanka, resulting in negative, long term, and short-term outcomes. The obesity epidemic has led to the early development of non-communicable diseases, once described as old age diseases. Health officials are now seeing more young people afflicted with heart diseases, hypertension, diabetes, skeletal joint pains, due to excess body fat which puts an increased weight load on the joints. Besides these physical outcomes, overweight children face ridicule from their peers leading to depression (Sunday Observer, January 13, 2013).

According to leading Diabetes expert and Endocrinologist, Dr. Noel Somasundaram of the National Hospital, Sri Lanka, interviewed by the "Sunday Observer", says that overweight and obese children tend to be teased because of their weight and are less likely to exercise as a result of teasing (see also Renuka Jayatissa, Daily News, January 20, 2019). They tend to perform poorly at school and are less likely to achieve their future potential than normal weight children. As a result, obese children are more likely to be depressed and have a higher risk of being unemployed. In addition, there are multiple physical problems with being obese. Skeletal problems include joint pains and even dislocated head of the hip bone because of the increased weight load on the joints. In Sri Lanka, studies show the prevalence of overweight and obesity to be 15-25% depending on age. These are alarming figures. Some of the problems of obesity include liver (fatty liver and later cirrhosis) and cardiovascular including high blood pressure, high cholesterol, diabetes and a higher risk of heart attack in young age.

Dr. Noel believes, this dangerous trend can be reversed and prevented—by eating well-balanced diets and taking plenty of exercise in place of the preferred junk foods and sedentary lifestyles which most young children indulge in. Overweight children are more likely to become overweight adults (Whitaker et al., 1997) and experiences associated with chronic diseases such as Type 2 diabetes, heart disease, stroke and cancers (World Health Organization, 2003). Of late children's dietary habits have shifted away from healthy foods (such as fruits, vegetables, and whole grains) to a much greater reliance on fast food, processed snack foods, and sugary drinks. These foods tend to be high in fat and/or calories and low in many other nutrients. Patterns associated with obesity are eating when not hungry and eating while watching television or doing homework. Over the past few decades the consumption of unhealthy foods, not just fast foods, has increased. Dr. Noel reasons that for childhood obesity, fast food consumption and lack of exercise become key factors.

BMI is used as a screening tool to identify possible weight problems for children. Another way to diagnose is to check the waist of the child for central obesity. According to WHO expert consultation (2004), classifications of bodyweight helps to determine, degrees of underweight and gradations of excess weight or overweight that are associated with certain non-communicable diseases. In plain language, it is an acceptable proxy for thinness and fatness and has been directly related to gauge health or the wellbeing of a country's population. However, according to Dr. Pujitha Wickramasinghe (2015) Morbidity related to obesity is associated with the degree of body Fat Mass (FM) and direct measurement of it would be the best way to make the diagnosis. However, due to practical difficulties surrogate markers have been used and most popular are the BMI and Waist Circumference (WC). Although none of them are specific, they could be used to obtain a reasonable assessment. However, the reliability of these measures depends on the cutoff values used. International cutoffs are mainly based on white Caucasian Studies and its usefulness in other ethnic groups are doubtful.

There is a clear ethnic difference in body composition, where Asian populations have more fat in the body to any given BMI compared to white Caucasian populations. Because of that even WHO has suggested having lower BMI cutoff values for Asian populations while IDF has used a lower waist circumference cutoff to diagnose metabolic syndrome in Asian populations. A set of BMI and WC cutoffs for Sri Lankan children were published by Wickramasinghe et al., and its usefulness in diagnosing obesity in a group of 5-15-year-old Sri Lankan children was compared with other available cutoffs (IOTF, WHO, British and CDC BMI and British WC). In the assessment of 920 children FM showed significant associations with BMI ($r=0.92$, $p<0.001$), WC ($r=0.90$, $p<0.001$). Based on %FM cutoffs, 22.5% girls and 18.5% of boys were obese. All international anthropometric cutoff values underestimated obesity.

Dr. Wickramasinghe holds that international BMI and WC based cutoff values had high specificity and a low sensitivity while Sri Lankan BMI and WC cutoff values had high sensitivity and a low specificity. Locally developed BMI and WC cutoff values are more sensitive in detecting cases of obesity. Consensus should be developed to improve the screening/diagnosis of obesity in children of Asian populations. Therefore, a diagnosis of obesity should be ideally based on absolute body FM measurements. However, due to practical difficulties, different surrogate measures have been used and BMI had been the most prevalent while WC had been gaining importance due to its direct association with metabolic risks. The fat content of the body varies between populations/ethnic groups, where for any given BMI value south Asian populations have a very high body FM, thus using the conventionally accepted 25kgm-2 and 30kgm-2 for overweight and obesity respectively. Thus, can lead to under detection of many obese individuals in the Asian region. This made the WHO to consider that BMI cut-offs should be low as 22-25 km-2 for adults. Similarly, the WC cutoff values are also low in Asian populations compared to white Caucasians. In children BMI and WC changes with age and sex, therefore a single cutoff value cannot be used. BMI for age charts were developed by different bodies (WHO, 2007; CDC/NCHS, 2000; British Growth Foundation, 1990).

Therefore, in multiethnic communities, a diagnosis of childhood obesity, using a universal definition had been unsuccessful. According to medical terminology, obesity is a condition of abnormal or excess fat accumulation in Adipose tissue, which may cause negative effects in the health of a person. It is believed that obesity occurs when energy intake exceeds energy consumption. This has resulted in a debate as to whether ethnicity-specific or population-specific BMI cut off values should be used. WC is more closely related to insulin resistance and associated metabolic abnormalities. WC is used as an absolute criterion in the diagnosis of metabolic syndrome, by IDF. WC has shown to have a strong association with metabolic derangements in obese Sri Lankan children than BMI. A limited number of studies have looked at the FM that is associated with adverse metabolic outcomes and most are in non-Asian populations. Few studies have identified the percentage of FM associated with metabolic

risk to range between 30-35% in girls and 20-25% in boys. International cutoff values have shown a very low sensitivity in detecting obesity among Australian children of white Caucasian and Sri Lankan origins. Once again, the IOTF cutoffs showed the lowest sensitivity. In view of this, in 2011, a new set of BMI and WC based cut off values were developed to diagnose obesity among Sri Lanka children. Rather than using the population distribution of the two parameters, percentage FM s are associated with metabolic risk and developed based on regression models. They were based on a % FM of 35% for girls and 25% for boys. They Validated and compared these cutoff values with existing international cutoff values in an independent group of Sri Lankan children.

However, from the above findings, what is clear is that weight gain in adult life is associated with increased morbidity and mortality at increasing BMI and that cut-off points for the amount of overweight should not be interpreted in isolation but as the combination with other risk factors of morbidity and mortality. Type 2 diabetes, cardiovascular disease, and increased mortality are the most important sequelae of obesity and abdominal fatness, but other associations are seen in musculoskeletal disorders, limitations of respiratory function, and reduced physical functioning and quality of life. Study of BMI related sicknesses are important because they reflect risk for type 2 diabetes and cardiovascular diseases, which are the major causes of death in adults in all populations, even in those who still have substantial malnutrition. In a study titled Nutritional and behavioral determinants of adolescent: a case-control study in Sri Lanka (Ratnayake et al., 2014) says socioeconomic and behavioral factors are major detriments of adolescent obesity in Sri Lanka. They hold that there is an urgent need to implement awareness as well as behavior modification programmes targeting adolescents, parents, and schools to control childhood and adolescent obesity". Mohamad (2015) says that by saying that childhood obesity leads to its related non-communicable diseases and psychosocial health problems. Changing dietary practices and maintenance of regular physical activity starting as early as infancy through parental initiative and social support interventions are the most important strategies to tackle childhood obesity. However, not only the food patterns, but obesity can be tracked in families, and one of the strongest predictors of child overweight is the BMI of the mother and father. As stated by Mohamed SM (2015) in recent years, progress was made in identifying genes that may contribute to this effect. According to him a recent study has shown that association with the FTO (Fat Mass and Obesity-associated) gene and found a strong association with BMI and weight among children. Moreover, a defect in the melanocortin 4 receptor gene (MC4R) is associated with a severe and early form of monogenic obesity in Children (Vos & Welsh, 2010). Among other probable causes of obesity, in school-age children, several studies have consistently reported that short sleep duration was an independent risk factor for obesity (Dev, McBride, & Cho, 2013).

Janitha Hettiarachchi et al., (2018) in their study concluded that the prevalence of overweight and obesity among 14 to 15-year-old adolescent school children in Colombo education zone was 10.8%

with no gender difference. Thus, overweight and obesity among adolescents in the Colombo education zone is a significant public health problem. In a related study Talagala and Aramepola (2016), citing (Story & French, 2004) says adolescents are specifically targeted to intense marketing efforts by manufacturing companies to promote unhealthy snacks since they represent the future adult consumers. Citing, McCullum C, and Achteberg, (2007) Talagala says that few examples of marketing strategies of include portrayal of popular figures, brand promotion and false health, nutritional or ethical claims displayed on food/drink labels. Their study further highlights the unsatisfactory use of food labels on packaged snacks by adolescents. Despite reading labels "frequently" (always or most of the time) and paying attention to a variety of contents in the label, their interpretation of the information given on labels for making a healthy snack choice was grossly inadequate. Advertiser's decisions on packaged snacks were mostly driven by false claims given on labels, rather than by the nutritional value of the product.

Since the use of food/drink labels among adolescents covered in the study is unsatisfactory there is an urgent need to develop and implement programmes aimed at adolescents through the existing school health promotion to improve the usage of food labels on making healthy choices on their food/drink snacks. According to Wickramasinghe et al. (2013), obesity-related metabolic abnormalities are seen among Sri Lankan children of 5-10 years of age. In their research, it is affirmed that nutritional transition is evident in the city of Colombo. Obesity and overweight in older children indicate emerging nutritional problems, caused by emerging patterns of the lifestyle and diet in response to social and cultural change. Their study of schoolchildren further shows a more sedentary lifestyle with less time spent on physical activity and more time watching television and attending tuition classes.

Nutrient-poor foods to young children contribute to many health hazards but few analyses have documented the present scenario of the effects of television advertisements of food in Sri Lanka. Since this has become a global problem, not only pertaining to Sri Lanka, The World Health Organization has also raised an alarm, and called for reduced High Fat, Salt, and Sugar (HFSS) food marketing to children, and they have urged implementation of right food policies by member states (WHO, October 20, 2006).

Citing (Brownell & Horgen, 2004; Institute of Medicine (IOM), 2006) by Haris an Bargh (2010), it is affirmed that "reduced physical activity and increased consumption of low-nutrition calorie-dense foods are both major contributors, and health authorities believe that the prevalence of advertising for unhealthy foods on children's television is a leading cause of children's unhealthy diet". Since most of the children's food preferences are formed during early childhood, many children are at risk for forming life-long preferences for foods laden in calories, fat, and added sugars and, thus, are also at increased risk for obesity due to TV food marketing practices. Speaking at a seminar titled "Unethical and Harmful Food Advertising and Promotion" organized by the Sri Lanka Medical Association,

President of SLMA Dr. Jennifer Perera has said that food industries have developed a special interest towards children in an attempt to promote their food and beverages (https://slcp.lk/harmful-food-advertising-and-alarming-rise-in-ncds/ Feb. 6, 2017).

In a Pilot Study Tillakaratne and Wijesinghe (2011) say that the frequency of consuming fast foods was significantly high among boys studied. According to leisure activities, 73.3% were involved predominantly in the sedentary type of activities. Television viewing or computing was also significantly high among boys. Children who engaged in watching television while consuming food reported poor diet consuming comparatively small quantities of vegetables, green leaves, and fruits daily with a high habitual intake of soft drinks, and fast foods.

Tillakaratne and Wijesinghe, conclude that the nutrition challenge among primary school children in Colombo is shifting from undernutrition to overweight obesity, with boys subjected to a higher risk. In another research. According to another study undertaken by Ratnayake et al. (2014) socioeconomic status, firstborn status, skipping breakfast, low fruits, and vegetable consumption, high television viewing, high energy intake, and physical inactivity are major contributory factors for adolescent obesity.

Another study Jayatissa and Ranbanda (2006) say that nutritional problems found in Sri Lanka, in their study of adolescents aged 10 to 15 years should be addressed through the schools in collaboration with the Ministry of Health and Education. Their study further affirms the prevalence rates of stunting, underweight, overweight, anemia and vitamin A deficiency and unhealthy patterns of food consumption and inadequate physical activities among adolescent school children in Sri Lanka. They recommend awareness should be created among children, teachers, and parents about food diversity, and the adverse effects of underweight and overweight and anemia, especially as they relate to educational achievement.

From these studies, it is clear that in recent years, many countries, including Sri Lanka, has witnessed, sudden and gradual rise in the prevalence of overweight and obesity among younger children. The health implications of these conditions and yet to be fully studied. According to researchers (Black et al., 2013; Misra & Khurana, 2011; Stein & Colditz, 2004), children who suffer obesity can become obsessed for life, can develop coronary heart diseases, non-insulin dependent diabetes mellitus, several types of cancers, osteoarthritis. Further, these children are vulnerable to psychosocial problems such as depression and low self-esteem. The lifestyle of many children is characterized by high consumption of energy-dense, nutrient-poor and fast foods, and low consumption of vegetables and fruits. Such food habits lead to the mounting prevalence of obesity and non-communicable diseases.

More recent evidence, however; suggests it may be the advertising, rather than the television viewing per se, that is particularly detrimental. In a study done by Samaraweera and Samanthi (2010) too concludes that television advertising has a strong relationship with the food demand by the children.

The use of persuasive marketing techniques such as employing celebrities, cartoon characters, athletes, and promotional gifts associated with advertising are commonly used in the marketing of unhealthy/non-core foods and drinks for children. Such persuasive marketing is proven to promote brand recognition, food preferences, purchase requests, and food consumption in children.

Schools would be the best place to conduct prevention programmes which should be designed for both children and parent (Rathnayake, Roopasingam & Wickramasighe, 2014). Easily available and accessible of energy dense, nutrient-poor foods, (French fries, pizza, rolls, instant noodles, sugar-filled food items) are considered and criticized for inculcating sub-optimal dietary habits among younger people (Cleland et al., 2004). As schools supposed to foster healthy eating habits, it is important and justified to probe into the key stakeholders, young school children, their parents, teachers, and canteen owners, and some advertising agents, to find out what type of foods they prefer and to know about the school food environment policies if they exist.

3. Theoretical Background

Keeping with the theme of this research paper, several theoretical models can be used to explain the food habit behavior of people. Social Cognitive Theory (Bandura, 2004), the Health Belief Model (Daddario, 2007), the Theory of Planned Behaviour (Ajzen, 1991) and the Food Related Lifestyle Model (Brunso & Grunert, 1998) are among the most commonly used theories in food behaviour research. Social Cognitive Theory (SCT) says that learning occurs in a social context with a dynamic and reciprocal interaction of the person, environment, and behavior. The unique feature of SCT is the emphasis on social influence and its emphasis on external and internal social reinforcement. SCT considers the unique way in which individuals acquire and maintain behavior, while also considering the social environment in which individuals perform the behavior. The theory takes into account a person's past experiences, which factor into whether behavioral action will occur. These past experiences influence reinforcements, expectations, and expectancies, all of which shape whether a person will engage in a specific behavior and the reasons why a person engages in that behavior.

The Health-Based Model (HBM) is based on the understanding that a person will take a health-related action (i.e., use healthy foods) if that person: feels that a negative health condition (i.e., obesity) can be avoided. In short, the HBM is a framework for motivating people to take positive health actions that use the desire to avoid a negative health consequence as the prime motivation.

Theoretically how influential are the television viewing on children? Cultivation theory proposed by Gerbner, Gross, Morgan, and Signorielli (1994) predicts that repeated exposure to consistent media portrayals and themes influences perceptions in the direction of the media portrayals. Social cognitive theory (Bandura, 1994) predicts that children learn from behaviors symbolically modeled in mass media as well as from role models in their immediate social environment. As cited by Helen et al., the

social cognitive theory has also been applied to previous nutrition (Sahay, Ashbury, Roberts, & Rootman, 2006) and child overweight prevention interventions (Cole, Waldrop, D'Auria, & Garner, 2006). Based on these theories it is predicted that children exposed to patterns of eating behavior modeled as prevalent and favorable in television food ads will adopt cognitions and behaviours supportive of such.

3.1 Problem Statement

Television food advertising has come to the public sphere as one of the probable causes of higher prevalence of diabetics and other health hazards. Media in Sri Lanka, from time to time publish timely reports that many school children are overweight or obese especially in cities. How serious is the problem? Is Television viewing being the only culprit responsible for health problems connected with children? Therefore, it is important to examine the extent to which television viewing, and television food advertising as variables, and how they influence eating habits of school children. There is also a need to look at the present regulations, which are in place and whether they can protect children from television advertisements and deceptive marketing practices. Due to the ubiquitous nature of television advertising, implications for a better policy and effective regulations that can be adopted by parents and service providers must be discussed.

Therefore, one of the hypotheses that need to be tested is how food advertisements and television viewing contribute to the negative dietary effects on children in Sri Lanka. Because of the seriousness of the problem, it is time to test, whether the viewing habits of school children in Sri Lanka influence their eating habits?

3.2 Specific Objectives:

To appraise two variables namely television viewing and exposure to fast food advertisements can be responsible for cultivating unhealthy food habits in school going young children (aged 10-12years) in Sri Lanka.

To appraise two variables namely television viewing and exposure to fast food advertisements can be responsible for cultivating unhealthy food habits in school going young children (aged 10-12years) in Sri Lanka.

To establish the connection between obesity among school children and television advertisements.

To find out is there any link between food habits of school children and television advertisements.

To examine the legal framework pertaining to laws of advertising and marketing unhealthy policies.

To recognize many genres of programming viewed by children.

To find out how much awareness do parents and school authorities have on the consequences of fast food consumption?

To recommend to policymakers a body of healthy food practices.

4. Methodology

The social constructivism paradigm is made used for this inquiry (Denzin & Lincoln, 2018). Through a mix approach framework, an attempt is made to understand and interpret perceptions of the respondents, namely children, parents, canteen owners and teachers. Using multiple, cluster sampling was used and a cross-sectional survey of 600 students aged from 11 to 12 in six provinces representing fifteen government and private schools (15) were included for this study. These schools are from six urban and semi-urban districts which include a heterogeneous ethnic population of Sri Lanka. The sample comprises 58 % of schoolboys and 48 % schoolgirls. The instruments used for this study includes questionnaires, face to face interviews and content analysis.

Prior to the commencement of the pilot study one day workshop was conducted to train the research assistants by the lead researcher and the team. The focus of the training was based on the research sample and locations, research design and instruments and especially on ethical considerations. It was followed by a pilot study conducted in three provinces by the research team and the research assistants. The validity and reliability of each question was measured separately during the pretest, and those which were found to be of low significance and also ambivalent were excluded accordingly. For anthropometric measurements, weight and height scale was closely monitored.

Two separate questionnaires were prepared for the children and parents. From grades 6 to 7, aged 11, 12 years, 30 children from each school were interviewed. Students of grade 6 and 7 were selected because they had a less crowded academic schedule when compared with year 10 and year 12 students. In addition to the school children another questionnaire was administered among 100 parents, that is six parents from each school. A free sampling method was used to select the parents and these parents were selected from the school children's sample itself. Fifteen class teachers and fifteen canteen owners were also orally interviewed through an interview guide. The content analysis of the television genres, the recordings were hired from Nielson and Nielson a leading global information and measurement company, which provides market research, insights and data about what people watch, listen to and buy.

It is known that researchers use stratified probability sampling to obtain a sample population that best represents the entire population being studied. Stratified probability sampling involves first dividing a population into subpopulations and then applying random sampling methods to each subpopulation to form a test group. The main advantage of stratified probability sampling is that it captures key population characteristics in the sample. Moreover, stratified probability sampling ensures that each subgroup of a given population is adequately represented within the whole sample population of a research study. Using measurement cited by Janita Hettiarachchi et al. (2018) based on World health organization (2007) in this study, Body Mass Index (BMI) for age is used to classify overweight and obesity. Obesity is defined as a BMI for age more than +2SD and overweight is defined as BMI for age between +1SD and +2SD.

Demographic information of children including age, gender, residential sector, ethnicity, religion, height, and weight, socio-economic background, food consumption patterns, preferred television program, and advertisements was collected through the questionnaires. After getting the basic information, under four basic themes, namely television shows watched by children, food habits of children, awareness about food and healthy practices including water drinking and time engaged in physical exercise, questions about knowledge of food regulations and media law were especially aimed at the parent's questions. The amount of water a child should drink daily, inculcating healthy eating habits, namely avoiding too much sugar, salt, fats, junk food and processed food and healthy eating, namely including enough grains and tubers, vegetables, Fish, pulses, eggs and meat, eating moderate among of fats, nuts and oil seeds were measured in the questions, and these measurements was based on the booklet "WE ARE HEALTHY" published by the Ministry of Health, Nutrition and Indigenous Medicine and the Ministry of Education in Sri Lanka (2016). Parents were asked about their occupation, education, attitudes toward food advertising, and their own policy suggestions as well.

Permission to conduct the research was obtained from the Department of Education in Sri Lanka, and regional directors promising in writing that the confidentiality of the participants and selected schools will be safeguarded. After getting the clearance, school principals, and class teachers were requested to assist the selection of children aged 10 to 12, in grades 6 and 7. Class teachers and canteen owners were interviewed because they were expected to be well informed of the food habits of their own students. The research protocols were officially approved by the education department of Sri Lanka.

After obtaining the approval, semi-structured interview with the help of a pretested questionnaire using mix approach was conducted with the selected children on the school premises during the interval period. The study was conducted between, August 2018 and November 2018. At the beginning of the interview sessions, the interviewees, whether they were children, teachers, parents or canteen owners, were given a brief verbal introduction about the purpose of this research and confidentiality will be respected and kept at all the times. Each interview lasted about 30 to 40 minutes.

The lead research team met and reviewed the reliability of data to minimize the errors. The data were processed in a computer and analyzed thematically using the SPSS version 25, along with some manual coding. Inter-rater reliability (Marques & McCall, 2005) was confirmed by two senior media lecturers, one senior economics lecturer and a lecture from health science and legal studies. Any mismatch was resolved by discussion until a consensus was reached and emerging themes were representative of data (Creswell, 2013). Adopting the template technique, the consensus was reached on the set of codes to be used, representing themes identified in the answers (King, 2004a).

5. Findings

The objective of this research was to understand whether two potent variables namely television viewing and exposure to fast food advertisements can be responsible for cultivating unhealthy food habits in school going young children in Sri Lanka.

Our descriptive analysis shows how television viewing is linked or has a positive relationship with BMI. In addition, we also had the following objectives in this research. Namely to establish the connection between obesity among school children and television advertisements, to find out whether there is any link between food habits of school children and television advertisements, to examine the legal framework pertaining to laws of advertising and marketing unhealthy policies, to recognize many genres of programming viewed by children, to find out how much awareness do parents and school authorities have on consequences of fast food consumption, and finally to recommend policymakers to establish healthy food practices.

First, we identify the association between postulated risk factors and Body Mass Index (BMI) in girls and boys in school children. This study specifically looked into the risk factors as they related to the effects of television viewing, fast food, physical activity, consumption of vegetable, fruits, nuts pulses, and ethnicity groups on student overweight and obesity as measured by the BMI.

The questionnaire was used to collect cross-sectional data on the island. Beyond descriptive statistics, inferential statistics were also employed to verify the effects and relationships between and BMI categories. A general linear mixed model was used to determine the association between BMI and the postulated risk factors and a Chi-square test was used to test food habits in ethnic groups in the association with BMI. The significant level was considered as 5% and all analyses were carried out using SPSS version 25.

5.1 Descriptive Statistics

5.1.1 Demographics of Study Population

The study's population consisted of 600 students. Distribution of the population on age, there were 311 (51.8%) of student who were 11 years old while 266 (48.2%) who were 12 years old. 303 (50.5%) who are in Grade 6 while the rest 297 (49.5%) are in Grade 7. 335 (54.8%) being Males while 265 (44.2%) were females. By religion, there were 403 (67.2%) Buddhists, 105 (17.5%) Catholics, 74 (12.3%) Hindus and 18 (3%) who followed Islam. Table 1 shows the demographic profile of the population.

Table 1. Demographic Profile of the Population according to Age, Grade, Sex, Language Speak and Religion

Characteristics	Sample responses (%)
Age	
11 years	311(51.8)
12 years	266(48.2)
Average age	11.5
Grade	
6	303 (50.5%)
7	297(49.5)
Sex	
Male	335 (54.8)
Female	265 (44.2)
Religion	
Buddhist	403 (67.2%)
Catholic	105 (17.5%)
Hindu	74 (12.3%)
Islam	18 (3%)
Total	600 (100 %)

5.1.2 Anthropometric Measurements

In the study of 335 males out of 600 students, the mean for height, weight and BMI was 1.46m, 39.1kg and 18.32 respectively with standard deviations of 0.09, 9.0 and 3.9, while in 265 females considered, the mean for height, weight and BMI was 1.42m, 41.23kg and 20.57 respectively with standard deviations of 0.09, 9.0 and 3.9 (Table 2).

Table 2. Anthropometric Measurements

	Males (n=335)		Female (n=265)		Total (n=600)	
	Mean	SD	Mean	SD	Mean	SD
Height (m)	1.46	± .09	1.42	±.101	1.44	± .09
Weight(kg)	39.10	± 9.0	41.23	± 8.2	40.04	± 8.8
BMI	18.32	± 3.9	20.57	±4.2	19.3	± 4.2

5.1.3 Body Mass Index (percentile)

We examined the age adjusted across the BMI categories accordingly, and 29 (4.8%) were Underweight, 475 (79.2%) were healthy weight, 57 (9.5%) were overweight and the rest 39 (6.5%) were obesity in the sample (Table 3).

Table 3. Body Mass Index Percentile

BMI Percentile	No of responses	% Sample	MBI Category
< 5:	29	4.8	Underweight (13.00-13.63)
>=5 and < 85:	475	79.2	Healthy weight (13.64-23.69<)
>=85 and < 95:	57	9.5	Overweight (23.70-25.82)
>=95:	39	6.5	Obesity (More than 25.82)

n=600

5.1.4 Body Mass Index Percentile and Gender

When considering the distribution of BMI by the gender, in both cases had a healthy weight. That is 274 (81.8%) of males and 201 (75.8%) of females had a healthy weight. But there were more males who were underweight 25 (7.5%) and more females who were in obesity 25 (9.4%).

Table 4. Body Mass Index Percentile by Gender

	BMI category	No. of responses	Percentage
Male	13.00-13.63	25	7.5
	13.64-23.69	274	81.8
	23.70-25.82	22	6.6
	More than 25.82	14	4.2
	Total	335	100
Female	13.00-13.63	4	1.5
	13.64-23.69	201	75.8
	23.70-25.82	35	13.2
	More than 25.82	25	9.4
	Total	265	100

5.1.5 Watching Television and BMI Category

Out of the total responses (594), only 18 did not watch TV while the rest, 576 watched. Considering the TV watching, 87, 295, 105 and 89 were respectively in BMI categories of underweight, healthy weight, overweight, and obesity (Table 5).

Table 5. Watching Television and BMI Category

	Underweight	healthy weight	overweight	Obesity	Total
Yes	87	295	105	89	576
No	1	9	6	2	18
	88	304	111	91	594

5.1.6 Hours of Watching Television and BMI Category

In this section we focus on the reported time spent viewing television by the study participants and its possible relationship to their BMI. Television viewing was established through the following question: "During a normal week, how many hours a day (24 hours) do you watch television?" The participants were asked to state their viewing time as "1 hour"; "2 hours"; and "more than 3 hours".

Out of the students who watched TV, 225, 225 and 109 students watch TV for one, two and more than two hours respectively. Irrespective of the number of hours the students watch the TV for all cases, students had a healthy weight. But when it comes to percentage, when the number of hours of watching TV increases, the tendency of students to be either overweight or obesity increased (Table 6).

Table 6. Hours of Watching Television and BMI Category

Watching television	**BMI category**				Total
(no. hours)	Underweight	Normal	Overweight	Obesity	
One hour	21	177	16	11	225
Two hours	5	182	20	18	225
Three hours	3	86	11	9	109
Total	29	445	47	38	559

5.2 Inferential Statistics

This section describes the inferential analysis of data. This study attempted to identify the relationship between television viewing, fast food, physical activity, consumption of vegetable, fruits, nuts, and pulses of boys and girls in relation to BMI. In addition, in this study, we also used a sub-sample (n=127) of the cross-sectional data obtained from food habits in three ethnic groups (Sinhalese, Tamils and Muslim) in the country and examined ethnic differences in the association with BMI.

5.2.1 BMI (kg/m^2) between Girls and Boys

The Table 7 shows the difference in BMI (kg/m^2) between girls and boys not exposed to the postulated risk factor and those exposed to that risk factor.

Table 7. Association between BMI (+/- kg/m^2, (SE) and p=value) and Explanatory Variables for Girls and Boys

Explanatory variables	Univariate (Adjusted for BMI for each gender)	
	Girls	Boys
Television viewing (hours/day)	P<0.001	P<0.001
<1	Ref	Ref
1-2	.245(0.029)	.219(0.028)
3+	.365(0.037)	.321(0.027)
Fast food (Times per week)	P<0.001	P<0.001
Never	Ref	Ref
1-2	0.154(0.025)	-0.165((0.164)
3+	0.206(0.057)	-0.205(0.023)
Physical exercise (hours/week)	P=0.50	P<0.001
Never	Ref	Ref
1-2	0.059(0.021)	0.194(0.023)
3+	0.075(0.032)	0.128(0.020)
Vegetables (times/week)	P=0.207	P=0.070
Never	Ref	Ref
1-2	-0.021(0.034)	-0.008(0.025)
3+	0.049(0.034)	0.048(0.026)
Fruits(times/week)	P=0.901	P<0.002
Never	Ref	Ref
1-2	-0.021(0.045)	-0.076(0.034)
3+	-0.024(0.044)	-0.120(0.029)
Nuts (times/week)	P=.078	P<0.001
Never	Ref	Ref
1-2	-0.038(0.024)	-0.174(0.018)
3+	-0.075(0.038	-0.276(0.025)
Pulses (times/week)	P=0.305	P=0.0124
Never	Ref	Ref

1-2	-0.001(0.027)	-002(0.034)
3+	0.033(0.034)	0.036(0.035)

Of the 7 explanatory variables in the model for children, for one variable (nuts), the p-value changed from non-significance (p=0.078) in the girl category to significant in the boy category (p=0.001) while one variable (fruit) changed from not significant (p<0.901) in the girl category to significant in the boy category (p=0. 0.002).

This analysis identified many statistically significant associations, although for most the effect sizes were small. The major risk factor was television viewing (3+ hours/day vs. <1 hour/day, 0.31 kg/m^2, p<0.001). Fast food (≥3 times/week + vs. never) increased BMI by 0.18 kg/m^2. Eating nuts (≥3 times/week vs. never) were associated with a lower BMI (-0.75 kg/m^2).

Physical exercise (0.08 kg/m^2.) was significantly associated with BMI. Eating vegetables, fruit and pulses (≥3 times/week vs. never) were not associated with BMI.

For boy category statistically significant associations with BMI were seen with television viewing (3+ hours/day vs. <1 hour/day, 0.27 kg/m^2, p<0.001), fast food (≥3 times/week vs. never, -0.19 kg/m^2, p<0.001), nuts (≥3 times/week vs. never, -0.23 kg/m^2, p<0.001). Eating vegetables (≥3 times/week vs. never) was not associated with BMI. Eating fruit (≥3 times/week vs. never) was associated with BMI (-0.09 kg/m^2; p =0.002).

5.2.2 Food Habits in Ethnic Groups in the Association with BMI

In this study, we also used a sub-sample (n=127) of the cross-sectional data obtained from food habits in three ethnic groups (Sinhalese, Tamils and Muslim) in the country and examine ethnic differences in the association with BMI. The data obtained from children aged 11-12 years in Colombo (n=69), Jaffna (n=59), and Batticaloa (n=30) were used. Chi square test was used, and significant level was considered as 5%.

Overall, food consumption patterns and frequency seem to differ among ethnic groups in the association with BMI. This tells us that there is statistically significant association between Ethnicity and BMI (λ^2=34,869, *p*=.00). Forty four percent (44%) of Sinhalese, 26.1% of Muslims, and 13. 5 % of Tamils reported eating bakery foods at least three times per week (λ^2=8.058, p=0.015), thirty nine percent (39%) of Sinhalese, 19 % of Muslim, and 11.5% of Tamils reported consuming sweet related food at least three days per week (λ^2=6.984, p=0.023), and thirty six (36%) percent of Sinhalese, 15.9% of Muslims, and 8.5% of Tamils reported consuming canteen food at least three days per week (λ^2=9.85, p=0.001). Overall, fruit and vegetable consumption rates were similar in the Muslim and Tamils groups; about 65%-67% of participants reported consuming fruits and vegetables at least three days per week. Although, Tamils seem to consume more vegetables and Muslims seem to consume more fruits, no significant ethnic differences of vegetable and fruit intake were found (λ^2=11.17. p=.083).

5.3 Media and Law

When we analyzed the responses, it was only 31% of the parents who agreed on the statement of "Media gives us information on healthy food for children" and 21 % disagreeing on this statement. Majority of them are on the neutral position which reflects that they are not sure about this position. Even though it is the duty of the government to educate the public about the healthy food and danger of junk food, the perception of the parents on this matter was that the government has not adequately fulfilled its obligation.

However, when parents were questioned about whether the media informed them about the dangers of junk food, the majority (63%) of the parents disagreed on this. This indicates the failure of many stakeholders in protecting the health of children. Out of the total population of the study, 48% of the parents were of the opinion that they were aware of the rules for advertising companies. While 37% are neutral regarding this matter which indicates that they were not fully aware of advertising regulations.

However, when they were questioned about the awareness of laws regarding food advertisement seen by children, a majority (67%) of them were either neutral or disagreed with the statement. When parents were questioned about this matter 43% agreed while 40% of them were neutral. Currently, Sri Lanka does not have any laws to regulate this matter. According to the study, it is reported that 52% of the parents are aware of displaying content of sugar on the product. It is also significant to note that equally another 48% is not clearly aware of this position.

Unawareness on much-required information of this nature leads towards unhealthy food practices among children. According to the study, 53% of the parents are aware of the food standardization in Sri Lanka. Significantly another 46% are neutral or not aware of such standardizations. It is a matter which needs to be considered seriously since unawareness on food standardizations leads towards health risks. Parents are not aware of the institutional set-up to standardize advertising agencies in Sri Lanka and it is a clear majority which is 84%.

It reflects that these institutions also have failed to become the consumer's representative. We can also look at some other countries to find out what initiatives and checks and balances have been put forward by them. In 1980, Quebec passed a law restricting junk-food marketing to kids under 13 years old in print and electronic media. The country maintains to have the lowest child obesity rate, and fast food expenditures decreased by 13% as a result of the law. Since 1991, Sweden had the strictest control with a ban on television and radio advertising targeted at children under the age of 12.

Children's programs in Belgium are prohibited from broadcasting commercials 5 minutes before and after the program. In January 2016, Taiwan placed restrictions on unhealthy food advertising for kids under 12 years old, so television channels whose intended audience is children cannot advertise HFSS foods during a set time period in the evenings. In Taiwan also, it is prohibited to promote products with the use of free toys at restaurants. More recently, the UK Committee of advertising Practice banned ads

of HFSS foods directed towards children under 18 years old, which took effect in July 2017.

5.4 Analysis of the Advertisements

All the food ads that came up during most-watched television programs and most watched children's programs were content analyzed. Our analysis showed the following.

Most of the food advertisement that came up during the most-watched programs were chocolate advertisements, ice creams, carbonated drinks, cheese which was included in the Burger King advertisement, Jams, biscuits, cakes, milk, and yogurt product, sauces and Kotthu Me advertisements (instant noodles), pizza and fruit drinks. All these advertisements lured children to buy their products by using compelling marketing and advertising techniques.

Some of the techniques used were, repetition, use of a narrator who sounds like an authority, attention-getting movements of the product, rapid spacing, catchy background sounds and music, branded characters, celebrity endorsements, child actors and so on. "Nurture your super kid'' type messages, wrong values, like no harm in telling lies, and eating or stealing favorite food, when no one is at home, were also given.

We also noticed all these advertisements we scrutinized showed only the tastes and where to buy but not any harmful effects of any kind. Our content analysis further showed that all the advertisements we analyzed included directly or indirectly the following actions in their ads. The promise of Happiness when consuming the product advertised, creating a positive association about the product. Some of the foods were endorsed by celebrities while some of the actions performed by children in the advertisement brought laughter to the people who watched. We could observe that none of the advertisements promoted fruits or vegetables, and not a single advertisement showed any warnings of their food items.

In our open-ended interviews, the following answers were given by the schoolteachers and canteen owners.

> "Many students don't take their breakfast at home. Some of them bring their breakfast to school and have it before 7.30 a.m. while some student has it from the tuck shop. As I observed most of the students eat junk food like noodles or something else for their breakfast. But there are some parents who try to feed rice for breakfast. But girls don't like it" (Class Teacher).
>
> "Students are addicted or influenced to short eats by the peers. Although some bring food from home, they also tend to eat short eats that others bring. This sharing habit is evident during sports practices and during the sports meet period" (Canteen Owner).
>
> "Students are addicted to sweet items such as éclairs, cream buns, jam tarts, doughnuts, etc." (A Teacher).

> "I think most of the parents give priority to their child's flavor. Because they may think without keeping their child hungry until they come home, it would be better to give something that they like to eat. On the other hand, their busy lifestyle may be also caused to that situation" (Canteen Owner).
>
> "Students those who do not have good food practices at their homes, that is because of their parent's busy lifestyle. But most of the educated parents and also some unemployed mothers strictly concern about good food habits" (A Teacher).
>
> "Mostly children are addicted to buying fast food items. The reason is that it may be their childhood habits and also media influence (e.g., eye-catching advertisements). Parents also allow them to buy such items" (A Teacher).

6. Discussion

In our analysis of a dataset (265 girls and 335 boys), we examined 8 assumed risk factors for BMI in girls and boys respectively. Despite finding many statistically significant associations with BMI, the effect sizes were small with many less than 0.1 kg/m^2.

In girls, the major risk factors for higher BMI were television viewing and eating fast food. Eating nuts were associated with a lower BMI. In boys, the major risk factors for a higher BMI were eating fast food and television viewing. Eating nuts were also associated with a lower BMI.

Caution needs to be applied when interpreting the results as the cross-sectional design of this study does not allow the determination of causality. In general, there was a consistency in the findings between girls and boys. In both age groups, there was a positive association between television viewing and BMI and there was evidence that the more television was watched the higher the BMI. This provides support for causal inference, but it remains possible that television viewing is simply a marker for other lifestyle factors, such as diet, lack of physical activity and socioeconomic factors, although we did adjust for vigorous physical activity and to a more limited extent diet.

In both groups eating nuts were associated with a lower BMI, and there was a dose effect. Nuts contain high levels of fats and protein and thus are high energy density foods and have sometimes been considered to be unhealthy but recent evidence suggests nut intake has been associated with the reduction of risk factors for chronic diseases.

There were two instances when the findings in girls and boys were in the opposite direction. In girls eating fast food was positively associated with BMI, but in boys was negatively associated with BMI. The positive association in girls was expected and is consistent with other studies. However, the boys' findings were unexpected. As boys reported their own eating behaviours they may have under reported fast food intake, particularly if they were overweight.

Associations were also observed with current television viewing and frequent nut consumption

(reduced BMI) in both girls and boys, suggesting that current behaviours are also important determinants of BMI. While each of these variables may influence BMI, they are not of sufficient magnitude to support major public health interventions. However, we recognize that establishing healthy behaviours in childhood may be important for later life.

The present study also indicated that a significant proportion of both boys and girls in Urban Sinhalese are having unhealthy dietary behaviors. The results of this study also indicated that Tamils were more prone to consume vegetables than other ethnic groups, probably due to Hindu religious beliefs.

As indicated above our descriptive analysis showed how television viewing is linked or has a positive relationship with BMI. In our sample, though limited, we could establish the connection between obesity among school children and television advertisements. Definitely, our findings show that there is a strong link between food habits of school children and television advertisements. Our present legal framework pertaining to laws of advertising and marketing not strong enough. Issuing official Gazette notices is not enough, and care should be there to disseminate such notices to a wider public. In Sri Lanka, people read government gazette notices only to find out available vacancies. Our findings show that awareness levels of parents and school authorities about the consequences of fast food is week and needs to be improved.

7. Limitations

This study was limited using cross-sectional data. To test for differences in risk of increasing BMI, one would need to monitor children over time. In this attempt, longitudinal studies on dietary behavior of school children are needed to guide sustainable and culture sensitive nutritional interventions in the country.

Our study had several limitations. As the questionnaire was self-completed, though with the help of research assistance, it is possible that some study participants may have misreported because of the sensitive nature of some of the questions, giving inaccurate responses or underestimates of some of the prevailing figures, intentionally or inadequately on the questions asked. We are also aware that our analysis of correlation of fruits and vegetable consumption was also further limited with regard to factors such as personal preferences, parental modeling, family atmosphere and economics, school-level factors such as nutrition education, availability, and policy of healthy and unhealthy foods, community factors and price levels. Though most of the schools had a sound food policy, more could be done to popularize healthy and nutritious food habits in school children.

8. Recommendations

Keeping with the information function of the media, it should act more responsibly and constantly raise awareness among advertisers and the public on the importance of regulation and guidelines on the use of children in advertising. They should also have a better understanding of international guidelines on the use of children in advertising.

To facilitate healthy eating, the interviewees recommended that schools should increase the availability of novel, reasonably priced, nutrient-rich foods while restricting the sale of energy-dense and nutrient poor products. Since it is totally impossible or difficult to stop eating unhealthy foods, one can also learn from “The New South Wales Fresh Taste Program” which has tried, innovative an environmental intervention in Australian school canteens. Adapting a kind of “traffic light” system approach, school canteens are given the “green foods”, i.e., fruits and vegetables menu followed by “amber foods” while the supply of “red foods”, i.e., foods with very high-calorie densities (e.g., savory and sweet pastries, pizza) are restricted to only 2 days per academic term. This initiative has resulted in a significant decline in the purchase of nutrient-poor foods by Australian students during the school hours (Neha Rathi et al., 2016). This innovative traffic light system should be strictly implemented even in Sri Lanka.

It is important to improve the quality of school food services by motivating school principles to adopt healthy eating food policies. These eating policies as far as possible should be designed with the objective of increasing the availability, accessibility, variety, and affordability of nutritious foods in the school canteens.

Regular airing of ads for healthy foods on popular TV programs should be done to counter the negative effects coming from Junk food advertisements. However, recently introduced Legal actions against manufacturers, sellers and distributors of beverages without labeling on sugar content, under article 32 of the Food Act No. 26 of 1980, is a right and a timely move in this regard. Health Ministry in Sri Lanka has issued the gazette notification in connection with introducing a labeling system on the sugar content for all bottled drinks except milk-based drinks, from August 1, 2016. Starting from August 1, 2016 manufacturers and importers should display the red label if the sugar content of the drink is over 11 grams per 100 milliliters. All locally produced and imported bottled drinks such as soft drinks, fruit drinks, etc in cans, bottles, packets, etc. except milk, should display the red label in all three languages. Middle-level sugar content (between 2 and 11 grams per 100 ml) should be indicated by an Amber colored label. A green label should be displayed for drinks which contain less than two grams of sugar per 100 ml.

However, obesity prevention is not simply an issue of individual responsibility and prevention mechanisms seem to be more effective in children than in adults. It is suggested that successful strategies for obesity prevention among children should be targeted and implemented in natural settings

for influencing the diet and physical activities at home, in preschool institutions, schools, or after-school care services. Since children spent more time in classrooms, school-based activities can play a positive role in promoting healthy food. Therefore, benefits of healthy eating, physical activities and body image should be integrated into the regular curriculum. Values of physical activities and the fundamental basic exercises should be included throughout the school week. Teachers should engage the parents to support activities in the home setting to lure children for nutritious foods and spend less time in screen-based activities. Our conclusions show that the current legal framework in Sri Lanka is not adequate and comprehensive enough for protecting children from exposure to television advertising for unhealthy food. Loopholes of the regulations are leaving children exposed to promotional techniques such as premium offers and celebrity spokesmen in advertisements for unhealthy foods.

9. Conclusion

As confirmed by our findings and also numerous previous researches, if not monitored properly obesity of the school children, who are the future hopes of our country could lead to many non-communicable diseases and psychosocial health problems. Because of the importance of this topic replications should be done using different samples to increase the applicability and generalizability. Our findings confirm that the prevalence of overweight and obesity has increased dramatically due to uncontrolled fast food habits in Sri Lanka. Our findings though limited support the contention that cumulative exposure to TV food advertisements promotes fast food among school going children.

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References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Bandura, A. (2004). *Health Education & Behavior*, *3*1(2), 143-164. https://doi.org/10.1177/1090198104263660

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Christian, P., de Onis, M., & Maternal and Child Nutrition Study Group. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet Aug 3*, *382*(9890), 427-451. https://doi.org/10.1016/S0140-6736(13)60937-X

Cleland, V., Anthony, W., & Crawford, D. (2004). What are grade 5 and 6 children buying from school canteens and what do parents and teachers think about it? *Nutrition & Dietetics*, *61*(3), 145-150.

Daddario, D. K. (2007). A review of the use of the health belief model for weight management. *Medsurg Nurs*, *16*(6), 363-366.

Denzin, N., & Lincoln, S. Y. (2018). The Sage Hand Book of Self-Control a Meta-Analysis of How Trait Self-Control Relates to a Wide Range of Behaviors. *Personality and Social Psychology Review*, *16*(1), 76-99. Qualitative Research. Sage Publishers. U.S.A. https://doi.org/10.1177/1088868311418749

Dev, D. A., McBride, B. A., Fiese, B. H., Jones, B. L., Cho, H., & Behalf Of The Strong Kids Research Team. (2013). Risk factors for overweight/obesity in preschool children: An ecological approach. *Child Obe*, *9*(5), 399-408. https://doi.org/10.1089/chi.2012.0150

Feranado, T. A., Abeykoon A. M. S. A., & Ganegoda, G. A. P. K. (2015). Let the children be fed ethically: An explorative study on children's advertising and advertising regulations in Sri Lanka. *Media Asia*, *42*(1-2), 106-114. https://doi.org/10.1080/01296612.2015.1072353

Freedman, D. S., & Sherry, B. (2009). The validity of BMI as an indicator of body fatness and risk among children. *Pediatrics*, *1*, S23-S34. https://doi.org/10.1542/peds.2008-3586E

Ganasegeran, K., Al-Dubai, S. A. R., Qureshi, A. M., Al-abed, A. A., Rizal, A. M., & Aljunid, S. M. (2012). Social and psychological factors affecting eating habits among university students in a Malaysian medical school: A cross-sectional study. *Nutrition Journal*, *11*, 48. https://doi.org/10.1186/1475-2891-11-48

Gerbner, G., Gross, L., Morgan, M., & Signorielli, N. (1994). Growing up with television: The cultivation perspective. In J. Bryant & D. Zillmann (Eds.), LEA's communication series. Media effects: Advances in theory and research (pp. 17-41). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.

Harris, J. L., Bargh, J. A., & Brownell, K. D. (2009). Priming effects of television food advertising on eating behavior. *Health Psychology*, *28*(4), 404-413. https://doi.org/10.1037/a0014399

Huse, O., Hettiarachchi, J., Gearon, E., Nichols, M., Allender, S., & Peeters, A. (2018). Obesity in Australia. *Obesity research & clinical practice*, *12*(1). https://doi.org/10.1016/j.orcp.2017.10.002

Joan, F., & Marques, C. Mc. (2005). The Application of Interrater Reliability as a Solidification Instrument in a Phenomenological Study. *The Qualitative Report*, *10*(3).

King, J. F., & Flenady, V. J. (2004a). *Indomethacin for inhibiting preterm*.

Kristen, C. C. C., Julee, W., Jennifer, D., & Heather, G. (2006). An Integrative Research An Integrative Research Review: Effective School-Based Childhood Overweight Interventions. *Journal for Specialists in Pediatric Nursing*, *11*(3), 166-177. https://doi.org/10.1111/j.1744-6155.2006.00061.x

Labeling on sugar content in beverages compulsory. (2016, August 10th). *Daily News.*

Labour (Cochrane Review). (n.d.). In *The Cochester, Library, 3*. Chichester, UK: John Wiley & Sons Ltd.

McCullum, C., & Achterberg, C. L. (1997). Food shopping and label use behavior among high school-aged. *Adolescence* Spring, *32*(125), 81-197.

Misra, A., & Khurana, L. (2010). Obesity-related non-communicable diseases: South Asians vs White Caucasians. *International Journal of Obesity*, *35*, 167-187. https://doi.org/10.1038/ijo.2010.135

Mistry, S. K., & Puthussery, S. (2015). Risk factors of overweight and obesity in childhood and adolescence in South Asian countries: A systematic review of the evidence. *Public Health*, *129*(3), 200-209. https://doi.org/10.1016/j.puhe.2014.12.004

Mohamed, S. M. (2015). Childhood Obesity: Epidemiology, Determinants, and Prevention. *Journal of Nutritional Disorders & Therapy*, *5*, 2. https://doi.org/10.4172/2161-0509.1000156

Neha, R., Lynn, R., & Anthony, W. (2016). Food environment and policies in private schools in Kolkata, India. Health Promotion International, *32*(2), 340-350.

Rathnayake, K. M., Roopasingam, T., & Wickramasighe, V. P. (2014). Nutritional and behavioral determinants of adolescent obesity: A case-control study in Sri Lanka. *BMC public health*, *14*, 1291. https://doi.org/10.1186/1471-2458-14-1291

Renuka, J., & Ranbanda, R. M. (2006). Prevalence of challenging nutritional problems among adolescents in Sri Lanka. *Food and Nutrition Bulletin*, *27*(2). https://doi.org/10.1177/156482650602700206

Sahay, T. B., Ashbury, F. D., Roberts, M., & Rootman, I. (2006). Effective components for nutrition interventions: A review and application of the literature. *Health Promot Pract*, *7*(4), 418-427. https://doi.org/10.1177/1524839905278626

Samaraweera, G. R. R. C., & Samnthi, K. L. N. (2010). *Television Advertising and Food Demand in Sri Lanka: A Case Study from Galle District*. Proceedings of the 1st International Conference on Business and Information, University of Kalaniya, Sri Lanka.

Savige, G. S., MacFarlane, A., Ball, K., Worsley, A., & Crawford, D. (2007). Snacking behaviours of adolescents and their association with skipping meals. *International Journal of Behavioral Nutrition and Physical Activity*, *4*(36), 1-9. https://doi.org/10.1186/1479-5868-4-36

Simon, P., Nguyen, H. G., & Robinson, J. (2015). Predictors of children's food selection: The role of children's perceptions of the health and taste of foods. *Food Qual Prefer*, *4*(40), 106-109. https://doi.org/10.1016/j.foodqual.2014.09.009

Stein, C. J., & Colditz, G. A. (2004). The epidemic of obesity. *J Cl in Endocrinol Metab*, *89*(6), 2522-2525. https://doi.org/10.1210/jc.2004-0288

Story, M., & French, S. (2004). Food Advertising and Marketing Directed at Children and Adolescents in the US. *International Journal of Behavioral Nutrition and Physical Activity*, 1-3. https://doi.org/10.1186/1479-5868-1-3

Talagala, L. A., & Arambepola, A. (2016). Use of food labels by adolescents to make healthier choices on snacks: A cross-sectional study from Sri Lanka. *BMC Public Health*, *16*, 739. https://doi.org/10.1186/s12889-016-3422-1

Thilakarathne, R. M. L. R., & Wijesinghe, D. G. N. G. (2011). Association between Nutritional Status and Life Style Practices of Primary School Children in the Colombo District: A Pilot Study. *Tropical Agricultural Research*, *22*(4), 392-401. https://doi.org/10.4038/tar.v22i4.3790

Vos, M. B., & Weish, J. (2010). Childhood Obesity: Update on Predisposing Factors and Prevention Strategies. *Curr Gastroenterol Rep*, *12*, 280-287. https://doi.org/10.1007/s11894-010-0116-1

WE ARE HEALTHY Empowering school children to champion healthy living & become change agents in society by Ministry of Health & Indigenous Medicine Colombo 10 Sri Lanka. (2016). Retrieved from http://www.healthysrilanka.lk/we-are-healthy/wearehealthy-en

Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *N Engl J Med*, *337*, 869-873. https://doi.org/10.1056/NEJM199709253371301

WHO. (1995). Physical status: The use and interpretation of anthropometry. *Report of a WHO expert Committee. Technical Report Series No. 854*. Geneva: World Health Organization.

Wickramasinghe, V. P. (2015). Validity of Newly Developed BMI and Waist Cutoff Values for Sri Lankan Children. *Journal of Obesity Weight Loss Therapy*, *5*, 282. https://doi.org/10.4172/2165-7904.1000282

Wickramasinghe, V. P., Lamabadusuriya, S. P., Atapattu, N., Sathyads, G., & Kuruparanantha, P. (2004). Nutritional Status of school children in an urban area of Sri Lanka. *Ceylon Medical Journal*, *49*(4), 114-118. https://doi.org/10.4038/cmj.v49i4.1920

Wickramasinghe, V. P., Lambadusuriya, S. P., Cleghom, G. J., & Davis, P. S. W. (2013). Defining anthropometric cut-off levels related to metabolic risk in a group of Sri Lankan children. *Annals of Human Biology*, 1-7.

World Health Organization. (2003). Diet, nutrition and the prevention of chronic diseases: Report of a joint WHO/FAO expert consultation. *WHO Technical Report Series, No, 916*. Geneva; World Health Organization.